

IN THE CLAIMS:

Please cancel claims 1-65 without prejudice and add new claims 66-106 as follows.

1-65. (Cancelled)

66. (New) Method for implementing transmission antenna diversity in a mobile communications system, which includes at least one receiving unit and at least one transmitting unit, adapted for data transmission connection over a radio path, said method comprising:

transmitting a signal through at least one of at least two transmission antenna routes of the transmitting unit, the signal containing signal information which identifies the transmission antenna routes in the transmitting unit;

choosing, in the receiving unit, an optimum transmission antenna route based at least on signals received from the transmitting unit that contain information identifying the transmission antenna route;

making the chosen transmission antenna route known to the transmitting unit with an antenna route choice notification; and

transmitting user data from the transmitting unit through a transmission antenna route selected for use in the transmitting unit, wherein the selection is based on the antenna route choice notification; and

verifying, in the receiving unit, the transmission antenna route selected for use wherein the verification is based on information in the user data, and identifying the transmission antenna route selected for use.

67. (New) A method according to claim 66, wherein the signal containing information which identifies the transmission antenna route, is a broadcast signal.

68. (New) A method according to claim 67, wherein the broadcast signals of the transmission antenna routes includes at least one information part which is identical.

69. (New) A method according to claim 68, wherein the information parts of the broadcast signals of the transmission antenna routes are identical.

70. (New) A method according to claim 67, wherein information to be broadcast is divided between the transmission antenna routes.

71. (New) A method according to claim 66, wherein the system comprises at least two transmitting units that are simultaneously in data transmission connection with the receiving unit over a radio path, wherein an optimum transmission antenna route combination which includes one transmission antenna of each of the at least two transmission units, is selected.

72. (New) A method according to claim 66, wherein the system comprises at least two transmission units, and the optimum transmission antenna route is selected based at least in part on broadcast signals received from the at least two transmission units of the system.

73. (New) A method according to claim 66, wherein the signal containing information which identifies the transmission antenna route, is a signal transmitted on a connection specific channel.

74. (New) A method according to claim 73, further comprising transmitting broadcast signals through the transmission antenna routes of the transmitting unit wherein the optimum transmission antenna route is selected based on the signals of the connection specific channel and the broadcast signals of the transmission antenna routes.

75. (New) A method according to claim 66, wherein the information identifying the transmission antenna route, is an antenna-route-specific identifier transmitted together with the transmitted signal.

76. (New) A method according to claim 75, wherein the information identifying the transmission antenna route selected for use, is an identifier transmitted among the user data.

77. (New) A method according to claim 76, wherein the identifier identifying the transmission antenna route selected for use is added to the user data in each of at least one transmission time slot.

78. (New) A method according to claim 76, wherein the identifier identifying the transmission antenna route selected for use is added to the user data at least once during the transmission on the transmission antenna route selected for use.

79. (New) A method according to claim 76, further comprising checking, in the receiving unit, the transmission antenna route selected for use based on the identifier transmitted with the user data.

80. (New) A method according to claim 79, further comprising:
generating statistics on how a measure of success of the transmission antenna route selected for use compares to the chosen optimum transmission antenna route, and
notifying the transmission unit, when the measure of success falls short of a pre-established threshold value.

81. (New) A method according to claim 80, wherein the transmitting unit is controlled to choose a pre-established transmission antenna route with the antenna route choice notification.

82. (New) A method according to claim 79, further comprising changing transmission settings of a next antenna route choice notification, if the transmission antenna route selected for use differs from the chosen optimum transmission antenna route.

83. (New) A method according to claim 82, further comprising sending a signal including the next antenna choice notification, with a higher transmission power.

84. (New) A method according to claim 82, further comprising coding the next antenna choice notification with better channel coding.

85. (New) A method according to claim 79, wherein the checking is performed by comparing the identifier of the transmission antenna route selected for use with the identifier of the chosen optimum transmission antenna route.

86. (New) A method according to claim 66, wherein the information identifying the transmission antenna route is produced with an antenna-route-specific signal shaping method.

87. (New) A method according to claim 86, wherein the antenna-route-specific signal shaping method is any one of an individual frequency offset, an individual symbol pattern, an individual hash code for spreading signal, an individual number of hash codes in parallel, or an individual channel coding method.

88. (New) A method according to claim 86, wherein the antenna-route-specific signal shaping method is orthogonal.

89. (New) A method according to claim 86, wherein the information identifying the transmission antenna route selected for use is an individual emission added to the user data.

90. (New) A method according to claim 86, further comprising checking in the receiving unit, the transmission antenna route selected for use based on an individual emission added to the user data.

91. (New) A method according to claim 90, wherein the checking is performed by comparing the individual emission of the transmission antenna route

selected for use with the antenna-route-specific signal shaping method of the chosen optimum transmission antenna route.

92. (New) A method according to claim 90, further comprising generating statistics on a measure of success of the transmission antenna route selected for use compares to the chosen optimum transmission antenna route, and notifying the transmission unit, when the measure of success falls short of a pre-established threshold value.

93. (New) A method according to claim 92, wherein the transmitting unit is configured to choose a pre-established transmission antenna route with the antenna route choice notification.

94. (New) A method according to claim 90, further comprising changing transmission settings of a next antenna route choice notification, if the transmission antenna route selected for use differs from the chosen optimum transmission antenna route.

95. (New) A method according to claim 94, further comprising sending a signal including the next antenna choice notification, with a higher transmission power.

96. (New) A method according to claim 94, further comprising coding the next antenna choice notification with better channel coding.

97. (New) A method according to claim 66, further comprising the step of channel coding the antenna route choice notification.

98. (New) A method according to claim 66, wherein the antenna route choice notification is implemented by symbol puncturing.

99. (New) A method according to claim 66, further comprising:
decoding the received user data,
wherein decoding the received user data is performed with a channel estimate of the chosen optimum transmission antenna route if the transmission antenna route for use is the same as the chosen optimum transmission antenna route, or decoding the received user data is performed with a channel estimate of the transmission antenna route selected for use if the transmission antenna route selected for use is different from the chosen optimum transmission antenna route.

100. (New) A method according to claim 66, wherein the transmission antenna routes are transmission antenna branches.

101. (New) A method according to claim 66, wherein the transmission antenna routes are transmission antenna beams.

102. (New) A method according to claim 66, wherein the system comprises at least two receiver units and the transmission antenna route selected for use is selected individually for each receiver unit based on the antenna route choice notifications.

103. (New) Arrangement for implementing transmission antenna diversity in a mobile communications system, wherein the system includes a receiving unit and a transmitting unit, the transmitting unit includes at least two transmission antenna routes,

and the receiving unit and the transmitting unit are adapted for a data transmission connection with one another over a radio path, wherein

the transmitting unit further comprises:

transmitting means for transmission of a signal, said transmitting means being arranged to produce in the signals to be transmitted information identifying the transmission antenna route;

means for receiving an antenna route choice notification;

means for selecting for transmission of user data a transmission antenna route based on the received antenna route choice notification;

means for using a selected antenna route for the transmission of user data, and

means for forming, in the user data signal to be transmitted, information identifying the transmission antenna route selected for use;

and

the receiving unit further comprises:

choosing means for choosing an optimum transmission route based on received signals having information identifying the transmission antenna route;

means for notifying the transmission unit of the chosen optimum transmission antenna route; and

verification means for verifying the transmission antenna route selected for use based on the information identifying the transmission antenna route

selected for use contained in the user data signal formed in the transmission unit.

104. (New) A transmitting unit for implementing transmission antenna diversity, the transmission unit comprising:

transmitting means for transmission of a signal, said transmitting means being configured to produce in the signals to be transmitted, information identifying a transmission antenna route;

means for receiving an antenna route choice notification;

means for selecting a transmission antenna route based on the received antenna route choice notification, for transmission of user data;

means for using a selected antenna route for the transmission of user data; and

means for forming, in the user data signal to be transmitted, information identifying the transmission antenna route selected for use.

105. (New) A receiving unit for implementing transmission antenna diversity, the receiving unit comprising:

choosing means for choosing an optimum transmission antenna route based on received signals having information identifying the transmission antenna route;

means for notifying a transmission unit of the chosen optimum transmission antenna route; and

verification means for verifying the transmission antenna route selected for use based on the information identifying the transmission antenna route selected for use, wherein said information is contained in the user data signal formed in the transmission unit.

106. (New) A mobile communications system comprising at least one transmitting unit and at least one receiving unit,

wherein at least one of said at least one transmitting unit comprises:

transmitting means for transmission of a signal, said transmitting means being arranged to produce in the signals to be transmitted information identifying the transmission antenna route;

means for receiving an antenna route choice notification;

means for selecting for transmission of user data a transmission antenna route based on the received antenna route choice notification;

means for using a selected antenna route for the transmission of user data; and

means for forming in the user data signal to be transmitted, information identifying the transmission antenna route selected for use; and

wherein at least one of said at least one receiving unit comprises:

choosing means for choosing an optimum transmission route based on received signals having information identifying the transmission antenna route;

means for notifying at least one transmitting unit of the chosen optimum transmission antenna route; and

verification means for verifying the transmission antenna route selected for use based on the information identifying the transmission antenna route selected for use, contained in the user data signal formed in a transmitting unit.